

HARDCOPY

21527 PCT/EP98/08375

SA 09/04/014

A 21

Transl. of WO 99/38676

21527 PCT/EP98/08375

Transl. of WO 99/38676

Mark-up

Description

Machine or Accessory for Producing Folded Containers, in Particular  
Folded Boxes, From Blanks

X RCF

(Technical Field)



5 The invention relates to a machine or accessory for  
making folded containers, in particular folded boxes, from blanks,  
~~The main aim of the invention is to provide a machine or accessory for making folded boxes from blanks according to the introductory clause of claim 1.~~

801

10 Folding-box gluing machines of the described type for  
making folded boxes from blanks have as is known at least the  
following working stations:  
a loader which ~~the~~ draws the blanks to be used at high  
speed from a stack and feeds them individually  
to the following first working station,  
15 an applicator for adhesive, normally paste, that applies  
an adhesive strip to the fold tabs to be glued,  
and  
a folding station in which a blank part to be provided  
with a glue strip for producing a glue joint is  
bent through 180°, thus being folded.

20 Adjacent the folding station there is normally a so-  
called transfer station in which the boxes are counted, marked,  
and, if damaged, culled out. Thereafter there is a pressing

- 1 -

station at whose intake an overlapping stream of folded blanks is  
formed which are held in the pressing station for some time under  
pressure so that the two blank parts of the glue joint are joined.  
At the folded-box gluing machine there is normally a packing  
5 apparatus in which the flat folded boxes are packed in cartons.  
Furthermore it is standard to provide between the loader and the  
adhesive applicator a so-called prebreaker in which the folded tabs  
are folded back and forth so that the corresponding fold lines are  
made soft by bending through 180°. Transport of the blanks through  
10 the individual working stations or accessories is done by conveyor  
belts.

In order that the machine can make containers of  
different shape, the individual stations have machine elements for  
working on and conveying the blanks that can be positioned for the  
various blank sizes. Such machine elements to be positioned are  
for example the stack walls and holding tongues of the loader, the  
15 folding elements of the folding station, and the adhesive nozzles  
or applicator elements of the adhesive applicator, as well as the  
transport belts in the individual stations or accessories. When  
made as an accessory the packing apparatus for the folded boxes and  
a so-called preloader for automatically supplying the loader have  
elements that must be positioned dependent on blank format. With  
the exception of the pressing station there are in each working  
20 station machine elements that must be repositioned with each change  
of blank format transversely or longitudinally to the travel  
direction of the blanks or even vertically.

RECEIVED

JUN 12 2002

21527 PCT/EP98/08375

Transl. of WO 99/38676

21527 PCT/EP98/08375

TECHNOLOGY CENTER H3700

Transl. of WO 99/38676

~~State of the Art~~

5 The product literature "DIANA 05-3 The Universally Usable  
Folded Box Gluing Machine" of applicant describes such a folded box  
gluing machine that has digital position indicators for the machine  
elements to be positioned. There is an electronic data book  
serving as memory unit for the desired positions of the various  
types of boxes which displays on a screen the desired position to  
the machine adjuster for manual setting. The folded-box gluing  
machine is also provided with an adjusting mechanism which is  
10 connected to the computer to directly and automatically set the  
machine elements for format by means of attached drive motors.  
This system is however very expensive.

Object of the Invention

15 The object of the invention is to inexpensively improve a  
machine or accessory of the described type where the machine  
elements are manually positioned so that the machine adjuster can  
manually rapidly set positions with little likelihood of error.

~~This object is achieved with the features of claim 1.~~  
as to be in the → claim 1, la 14-23

20 The solution of the invention has the advantage that the  
machine adjuster when resetting position is shown the amount of  
repositioning needed to the desired position and preferably also  
the direction of positioning movement right there where the

- 3 -

adjustment must be made. When the difference is equal to zero the  
desired position has been reached. The adjuster does not need to  
read the desired position from a remote screen and make a note of  
it or remember it so that he can set the corresponding machine  
5 element to the right position. With the large number of machine  
elements to be positioned in a folded-box gluing machine the  
remembering and transferring of desired positions creates the  
danger of errors and is also time-consuming, e.g. if the adjuster  
makes a printout of the values.

10 The solution according to the invention has the further  
advantage that it contains elements that can all be used when  
refitting the machine to fully automatic operation.

~~The dependent claims describe various preferred and particularly advantageous embodiments of the invention.~~

Brief Description of the Drawing

The drawing serves for describing the invention with  
reference to a schematically illustrated embodiment.

FIG. 1 shows in a schematic side view the individual  
stations of a folded-box gluing machine, and

20 FIG. 2 schematically shows the arrangement of the  
elements serving for positioning.

- 4 -

~~Embodiment of the invention~~ *See Des*

In the transport direction (from right to left) the machine starts with a loader 1 which draws the blanks to be worked with high speed from a stack and feeds them individually to the downstream working stations. The loader 1 has a stack support on which the blanks are set in a stack and which is defined by a output conveyor formed as a belt conveyor that engages the bottom of the stack. On its output side the stack support is provided with adjustable tongues that end slightly above the output conveyor so that a gap is left open through which the blanks can be drawn individually off the bottom of the stack. Such a loader is described in German patent 2,946,426.

When the box <sup>format</sup> is changed, the side walls 2 of the stack support -- as shown in FIG. 2 -- are repositioned transversely to the transport direction. They are to this end mounted on adjustment spindles 3 which are each mounted at their ends for rotation in side walls of the station.

The loader 1 is followed by a prebreaker 5 which in this embodiment works in two stages. The prebreaker 5 has folding elements 6 that fold tabs forward and back so that the corresponding longitudinal fold lines are softened by folding through 180°. Two-stage construction makes it possible to soften several fold lines. With certain box shapes glue applicators are also provided inside the prebreaker 5 in order to apply additional glue strips extending longitudinally. The folding elements 6, for

- 5 -

example roller arms, supported folding belts, <sup>or</sup> roller rails, must be repositioned transversely like the conveyor belts leading through the prebreaker 5 when the box shape is changed. In order to facilitate such transverse positioning, these elements and the conveyor belts extending through the prebreaker -- as shown in FIG. 2 -- are also mounted on adjustment spindles that extend full width transversely with their ends rotatably mounted in the side walls 4 of the machine.

Following the prebreaker 5 as the next working station is the folding station 8 at whose upstream side is an applicator 9 for an adhesive, normally paste. The adhesive applicator 9 has extending transverse to the positioning elements glue nozzles or glue plates from which the adhesive is applied in strips to the blanks. Thereafter the fold tabs of the blanks are folded by elements 10 (folding belts, roller arms, roller rails), with the desired glue joint being formed. Even the folding elements 10 must be transversely positioned according to blank size. They are to this end, like the glue-applying elements of the adhesive applicator 9 and the conveyor belts extending through the folding station, adjustable across the width of the machine by spindles 11.

Subsequently the flat folded boxes are fed to a transfer station 12 whose conveyor belts 13 are also transversely positionable on spindles 14. In order to accommodate various box lengths the transport length of the conveyor belts 13 can also be varied in the travel direction. To this end at least the output rollers of a conveyor belt are moveable in and against the

- 6 -

transport direction by means of a rack. In the transfer station a <sup>movement</sup> ~~begin~~ of the folded boxes is produced that subsequently is advanced to a following pressing station. In addition in the region of the transverse station 12 there are devices by means of which the boxes are counted, marked, and, if damaged, culled out. Even these devices must if necessary be adjusted when the box shape changes transversely, longitudinally, or vertically. The pressing station has pressing elements by means of which the glue seams are held under pressure until the glue is fixed.

FIGS. 1 and 2 do not illustrate accessories that also have elements positioned transversely, longitudinally, or vertically. Such an accessory is for example a packing device following the pressing apparatus 15 and serving to pack the flat folded boxes in cartons. A particularly ideal packing device is described in German patent 2,825,648. A further additional system is for example a so-called preloader that serves for increasing the production capacity upstream of the loader. Such a preloader is described in German published application 195 35 903. It serves to feed the blanks to the stack of the loader 1 in overlapping condition.

Even these additional systems have, for receiving, working on, or advancing the blanks, machine elements that must be repositioned when the box shape changes. They therefore have additionally or even alone the elements described below for the box-folding machine and which must be used on for conversion to another box format.

- 7 -

Each adjustment spindle 3, 7, 11, and 14 projects somewhat from the side wall 16 of the respective station on the service side. Thus a service person can use an actuating tool, for instance a crank, electric wrench, or a pneumatic tool in order to rotate the adjustment spindles 3, 7, 11, and 14 and thereby change the positions of the machine elements mounted on them. On the outer side of the side wall 16 there is for each adjustment spindle 3, 7, 11, and 14 a position sensor 17 for determining the actual position of the machine element to be positioned. The position sensors 17 can be of the known absolute- or relative-measurement type that produce an output signal corresponding to the position of the machine element.

Each position sensor 17 is connected with a calculating and memory unit 18 in which the actual position of the respective machine element for the various boxes is stored. Preferably the position sensors 17 are connected via a buss system 19 with the calculating and memory unit 18.

Each machine element to be positioned is associated with a display 20 that is also connected via the buss system 19 with the computing and memory unit 18. The displays 20 are each adjacent the respective machine element to be positioned so that operating personnel can read them while making adjustments. Preferably the display 20 is as shown in FIG. 2 integrated into the respective position sensor 17. The computing and memory unit 18 calculates for each machine element the difference between the stored desired value and the measured actual value of its position and transmits

- 8 -

the difference to the respective display 20 where it is shown numerically or graphically. The adjusting personnel thus has the difference value in his view. He need merely rotate the respective spindle 3, 7, 11, or 14 until the difference is equal to zero.

Preferably the respective computer -- here the calculating and memory unit 18 -- also determines the necessary direction of movement of the machine element, transmits it to the respective display, and displays it there. This can also be done by a corresponding graphic display, for example by a colored display, or by use of a sign.

In this embodiment the calculating and storage unit 18 holds both the data for the desired positions as well as the calculator for determining the difference between the desired positions and the actual positions. Since position sensors with integrated processors are available, such position sensors can be used to calculate the difference. In this case a separate memory unit is needed only to hold the desired positions and feed them to the respective integrated processors. This solution is particularly advantageous when retrofitting existing machines that already have a memory unit for the desired positions.

A further also preferable retrofittable embodiment has in addition to a separate memory for the desired positions, individual calculators for each measuring and display device.

Such a calculator holds the desired positions from the memory unit and the respective actual positions from the position sensors. It calculates the difference between the respective

actual and desired positions and transmits the results to the respective displays.

Preferably for each machine element to be positioned there is also the possibility to display the actual position for monitoring purposes. Since each display 20 is connected with the respective position detector 17 for determining the actual position, the displays 20 are preferably also used to show the actual position, for example can be switched between the two display values. Alternatively separate displays can be provided for the actual positions of the respective machine elements. Thus each position sensor 17 can have a second display for the actual position.